Taikan

USER MANUAL

1550nm Transmitter

OT-860-1550-xx-SA-x-x

Taikan

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Please read this manual thoroughly before use.
Retain this manual for future reference.

Taikan 1550nm Transmitter Owner’s Manual

This manual is intended for use by purchasers of Taikan’s 1550 family of transmitters and their qualified technicians. This document is the property of Taikan Company Inc. (“**Tai**kan”) and embodies proprietary subject matter.

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1550nm Optical Transmitter units may emit harmful laser radiation when the product is powered on or when the case is opened.

Please be cognizant of all safety guidelines and adhere to the recommendations listed.

SAFETY PRECAUTIONS

> Read the user manual carefully before proceeding with any part of the installation.

> Installation and operation of the product must be performed only by qualified personnel and always in accordance with applicable electrical codes.

> All warnings on the product and in the operating instructions should be adhered to.

> Unplug the product from the power outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth. For the optical connector it is recommended that you use RIFOCS CO. , Ltd's 945/946.

> Do not block or cover openings . These are provided for ventilation and protection from overheating. The maximum operating temperature is 50°C (122 °F)

> This product should be operated only from the type of power sources indicated on the marking label.

> This product may be equipped with a polarized AC line plug (a plug having one blade wider than the other or a different shape). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug into the outlet, try reversing the plug. Contact your electrician to replace the obsolete outlet if this still does not work. Do not compromise the safety purpose of the polarized plug.

> For added protection during a lightning storm or when the equipment is left unattended or unused for long periods, unplug it from the power outlet and disconnect the cables between the equipment and the fiber subsystem. These precautions will prevent damage to the equipment that could be caused by lightning strikes or power line surges.

> Do not attempt to service this equipment yourself as opening or removing the cover may expose you to dangerous voltages or other hazards. Refer all servicing to Taikan Company. A Taikan representative can be reached at support@taikan.com
If any parts need to be replaced notify a Taikan representative at support@taikan.com

> Unauthorized alteration or inappropriate repair is ***NOT*** allowed and may cause irreparable damage to product. Taikan does not assume any responsibility for these modifications.

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// INTRODUCTION

PRODUCT SUMMARY

The OT-860-1550-xx-SA-x-x (a 1550 nm optical transmitter) converts RF cable signals to fiber signals, and distributes them throughout a HFC network. This unit is primarily used in upgraded cable television and fiber distribution systems.

The OT-860 unit is available with a variety of options, including automatic gain control, laser overheat protection, automatic power control and advanced prediction distortion circuit.

Each transmitter is designed to fit in a standard 19 inch rack and can support up to 77 NTSC channels.

STANDARD FEATURES

- 1550 nm externally modulated optical transmitter
- RF bandwidth: 54–860 MHz
- Headend 19 inch rack mount enclosure
- LED status and alarm monitor indicators on front panel
- Network interface port: RJ45, R232 support IE & SNMP
- Power Supply of 110~250 Vac
- Power Consumption of ≤50 W
- Operating Temperature of 0°C (32°F) to 65°C (149°F)
- Storage Temperature of -20°C (-4°F) to 70°C (158°F)
- Dimensions (LxWxH) of 483 x 385 x 44mm (19 x 14 x 1.75 in)
- DFB laser type. Laser Range 5~9 dBm (4~8mW)
- Front Panel RF test port -20dB

NOMINAL SPECIFICATIONS*

OPTICAL FEATURES

Optical Wavelength:	1550 nm
Optical Return Loss:	≥ 60 dB
Optic Connector Type:	SC/APC or FC/APC

LINK PERFORMANCE

CNR:	≥ 52 dB
CTB:	≥ 65 dB
CSO:	≥ 65 dB

RF FEATURES

RF Bandwidth:	54-860 MHz
RF Input Level:	23 dBmV
RF Flatness:	≤ ± 0.75 dB
RF Return Loss:	> 16 dB
RF Input Impedance:	75 ohm
Connector Type:	F type

* Specifications and features are subject to change without notice

SECTION TWO

// INSTALLATION

1 UNPACKING

Carefully open the package and adhere to all safety guidelines outlined in the safety section. Check the packaging material for the following components.

- 1550nm optical transmitter
- User Manual
- Test Report
- Power Cord

It is highly recommended that the cover be left on the optical connector until you are ready to install the transmitter into the headend rack. Not complying could “pollute” the connector thereby compromising the transmission quality. The side effects include:

- Decrease in analog signal transmission quality
- Increased incorrect data rate for the digital signal
- Decrease in optical power
- Optical receiver’s optical power is compromised
- Pollution of the other optical components

Please notify your Taikan representative (support@taikan.com) if any of the items appear lost or damaged.

2 STATIC SENSITIVITY

When opening or operating the product, please comply with standard static protection procedure, such as using a grounding metal wrist belt, grounding worktop & grounding conductor.

Adhering to these guidelines will minimize the risk of damaging the product.

3 POWER SUPPLY CONDITION

The transmitter is powered by AC or steady voltage DC.

- AC Input: 94-245 VAC, 50-60 Hz
- DC Input: 36-60 VDC, floating
- Power Consumption: Maximum 50 W

4 TRANSMITTER PLACEMENT

The transmitter is designed to fit in an EIA standard 19-inch (480 mm) equipment rack.

When placing the unit inside the rack, we recommend leaving one open slot (approximately 1 3/4”) between each unit. Doing so allows for cooling. From the front of the rack, cover any open slots with a blank plate to minimize the risk of dust entering the rack.

It is recommended that the transmitter be placed in an environment that maintains a temperature of approximately 25° C (77°F).

5 ELECTRICAL CONNECTION

The transmitter should have good grounding with a resistance <4 ohm. According to the international standard, the 220 V plug in adopts tri-wire rule, while the middle wire is the grounding wire.

The transmitter’s power supply has overflow protection. It can work with a 110~254 VAC electric network, while the microprocessor monitors the output DC voltage.

Prior to connecting the circuit, use the electric wire (#20 AWG or >) to connect the grounding screw on the bottom to the grounding frame. When using the DC input power supply, the equipment chassis must be grounded.

NOTE TO CATV SYSTEM INSTALLERS: This reminder is provided to call your attention to NEC Articles 810- 21, 820-22, and 820-40 that provide guidelines for proper grounding. In particular, these articles specify that the cable ground shall be connected to the building grounding system, as close to the point of cable entry as practical.

6 RF CONNECTION

Connect the RF cable & the connector on the transmitters rear panel. The RF Connector is a F type plug with a resistance of 75 ohm.

7 OPTICAL CONNECTION

Connect the output fiber optic jumper to the proper input connector socket. The connector types are FC/APC, E-2000, pigtail or SC/APC.

SECTION THREE
// OPERATION

1 ON/OFF KEY BUTTON

After powering on the transmitter from the back panel, press the On/Off button to activate the transmitter.

2 STATUS INDICATOR (A GREEN LIGHT DENOTES ACTIVITY)

> Laser – Laser status
> RF – RF status
> Temp – System temperature
> Power 1 – Furthest power outlet on the back panel
> Power 2 – 2nd power outlet on the back panel

3 DISPLAY

LCD displays selected menu items and warnings.

4 DIRECTIONAL ARROWS

Select these buttons to toggle through each main menu category. ▲ ▼

5 SELECT BUTTON

Press the button once to toggle through the various subcategories. Press it again to select the setting you would like and return to the main menu.

6 OMI, AGC & MGC STATUS INDICATOR

> AGC – Automatic gain control
> MGC – Modulation gain control
> OMI – Optical modulation intensity

7 MODULATION DEPTH INDICATOR LIGHT

8 RF TEST PORT

START UP

1 TURN ON THE POWER SWITCH ON THE REAR PANEL

Turn the optical power on from the front panel On/Off key. Wait a few seconds for the transmitter to do a self check. After the check is complete the screen will display a welcome message with the product model indicated.

2 STATUS LAMPS SHOULD REFLECT THE FOLLOWING

> Laser – Green
> RF – Green
> Temp. – Green
> Power – Green

3 ACCESSING THE MAIN MENU

To access the Main Menu, use the arrow buttons on the front panel and toggle through the options listed on the next page.

4 ACCESSING THE SUB MENU

To access the Sub Menu stop on the main menu topic you would like to view and press the ‘Select’ button.

To exit out of the Sub Menu press the select button a 2nd time. Please note that pressing the ‘Select’ button a second time saves the changes you have made.

5 MENU DEFINITIONS*

> Main Menu	–	Default Description
> Descriptor	–	Equipment model
> Serial Number	–	438292F
> Model Number	–	10020476
> Output 1	–	Displays current output
> Output 2	–	Displays current output
> LD S/N	–	204188
> Laser Current	–	00mA
> Laser Temperature	–	24.6 °C
> TEC Current	–	0.09 A
> RF Mode	–	AGC (press ‘Select’ to change and toggle through the options)
> OMI Adjust	–	0.5 dBm (press ‘Select’ to change and toggle through the options)
> RF Level	–	OK
> SBS	–	OK
> SBS State	–	OK
> CSO State	–	OK
> Date	–	Displays date
> Version	–	08.05
> System Temperature	–	Reflects current temperature
> Voltage Monitors (5,-5,24V)	–	-5, 5, 24V
> IP	–	192.168.000.012
> Sub	–	255.255.255.000
> GW	–	192.168.000.001
> TR1	–	192.168.006.144
> TR2	–	192.168.006.144

Information above is for reference only. The data will vary by unit.

SECTION FOUR

// ADJUSTMENTS

ADJUSTING THE OMI

Note: The default OMI is set at AGC status.
The Optical modulation intensity (OMI) is set at the optimal level at the time of production. The "Modulation Depth" indicated on the front panel displays at the NOM position. The NOM position refers to the Modulation Depth when the full channels are loading, or when the system CNR ≥ 53 dB.
Increasing the OMI value, will result in the following:

> CNR – Increases > CTB & CSO – Decreases

Decreasing the OMI value, will result in the following:

> CNR – Decreases > CTB & CSO – Increases

SETTING AGC STATUS

Please note that the OMI is set at an optimal level and it is recommended that the value not be adjusted.

ADJUSTING OMI UNDER AGC STATUS

I. Press the arrow button on the front panel until 'OMI Level' displays on the screen.
II. Press the 'Select' button and toggle through the menu using the arrow button to verify the current OMI status.
If the display shows RF Mode = AGC, then the unit is under AGC status
If the display shows RF Mode = MGC, then the unit is under MGC status
III. To change the status to AGC follow these steps.
Press the 'Select' button to enter the subcategory, to display RF Model=
Press the ▲ Directional Arrow to confirm RF Mode = AGC. AGC is now complete.

SETTING MGC STATUS

I. Press the arrow button until the display shows the OMI Level Menu
II. Press the 'Select' button to enter the sub menu and toggle through with the arrows until it displays OMI ADJ= + X
III. Toggle through with the arrow button until you find the appropriate value. The values are in increments of 0.3 dB.
IV. Press the 'Select' button again to confirm the OMI value.

ADJUSTING MGC STATUS

I. Press the arrow button until OMI Level appears on the display.
II. Press the "Select' button to enter the sub category and toggle through with the arrow button to display the RF Mode = AGC
III. Press the arrow button to confirm , RF Mode= manual
IV. MGC has been successfully set

I. Confirm that the RF Mode=MGC
II. Gently place a '-' screwdriver into the OMI adjusting hole. Carefully adjust the OMI to the NOM position. You will know when it is in the NOM position when the two green lamps turn on. At this point the RF status will turn from red to green.

SECTION FIVE

// NETWORK SETUP

NETWORK SETUP

Taikan's 1550 Transmitter is designed to be compatible with an EDFA amplifier. The following factors should be taken into consideration when doing so:

- Chromatic Dispersion
- SBS
- SPM (Self Phase Modulation)
- Other non linearity effects of fiber optics

Outlined below are some simple rules for your reference:

CHOOSING THE APPROPRIATE SBS VALUE

To transmit more than 100km, you need to select 13 dBm SBS restrain status. 13dBm restrain status should be selected because of SPM and optic fiber chromatic dispersion. Not extending the bandwidth status when the fiber length is longer will compromise the transmitters CSO performance. A smaller line bandwidth should be selected for longer distances. The following table shows the recommended fiber lengths for each SBS restraint status.

Optical Fiber Length	SBS Restrain Condition
< 60 km	13 dBM, 16 dBm, 18dBm
< 70 km	13 dBm, 16dBm
< 120 km	13 dBm
> 120 km	13 dBm (CSO performance may vary)

SBS RESTRAINT VALUES

The table below shows the limit values for the corresponding SBS restraint power.

SBS Restraint Power	Optic Fiber Input Power Limit
18 dBm	Max 18.4 dBm
16 dBm	Max 16.4 dBm
13 dBm	Max 13.4 dBm

Please note that if the power is greater than the stipulated limit, it will result in the following:

> Lower frequency band will have 1/f noise
> The CNR will be compromised on lower channels
> HUM is also compromised

ADJUSTING SBS VALUES

The default SBS restraint value is 16.5 dBm. To adjust this value follow these steps:

I. Press the arrow button, and select 'SBS Menu'
II. Press the "Select' button and toggle through the options using the arrow button. Select "SBS=16.5"
III. Press the 'Select' button, to begin selecting the desired "SBS" value
IV. Use the arrow button to select the required SBS critical value
V. Press the 'Select' button again for confirm

SECTION SIX

// WARNING INDICATORS

TRANSMITTER WORK STATUS	STATUS DISPLAY	LED COLOR	EXPLANATION
> Present laser deflection is low	Warning: Lsr Bias Low	RED	Predicts the deflected circuit fault or laser aging. The transmitter needs repair.
> Present laser deflection is high	Warning: Lsr Bias Hi	RED	Predicts the deflected circuit fault or laser aging. The transmitter needs repair.
> Laser temperature is high	Warning: Laser Temp Hi	RED	Laser temperature is hovering from 25 °C. Check whether the room temperature is still in the recommended range. Continue to monitor the situation.
> Laser output power is locked	Warning: Laser Pwr Lock	RED	The laser output power has moved from the correct value but the circuit is locked. Continue to monitor the situation.
> Laser temperature is locked	Warning: Laser Temp Lock	RED	Laser temperature control loop fault. Check the room temperature and confirm whether it is still in the recommended range. Continue to monitor the situation.
> Transmitter environment temperature is low	Warning: 1 temp (12) Lo	RED	Optical transmitter environment temperature has moved from 25 °C. Monitor the situation closely until the warning light has disappeared.
> Transmitter environment temperature is high	Warning: 1 temp (12) Hi	RED	Optical transmitter environment temperature has moved from 25 °C. Monitor the status until the warning disappears.
> Modulator deflected	Warning: Modulator Bias	RED	Modulator deflection point is close to maximum. Continue monitoring. The deflection may need to be reset.
> Modulator deflection floating	Warning: Mod Drift Hi	RED	Modulator deflection point is close to the maximum. Continue monitoring. The deflection may need to be reset.
> Transmitter inner temperature is high (1)	Warning: 1 temp (L)	RED	Transmitter inner environment temperature is close to limitation. Check the surrounding temperature and continue to monitor the device.
> Transmitter inner temperature is high (2)	Warning: Code #13c	RED	Transmitter inner environment temperature is close to limitation. Check the surrounding temperature and continue monitoring.
> Transmitter interface board temperature is low	Warning: Amb temp low	RED	Transmitter inner panel temperature is close to limitation. Check the surrounding temperature and continue monitoring the device.
> Transmitter interface board temperature is high	Warning: Amb temp high	RED	Transmitter inner panel temperature is close to limitation. Check the surrounding temperature and continue to monitor the device.
> RF Input gain is low	Warning: RF Input Low	RED	RF input gain is close to minimum value of AGC. Check the input gain & route. Continue monitoring
> RF Input gain is high	Warning: RF Input Hi	RED	The input gain is close to the maximum value of AGC. Check the input gain & route. Continue monitoring the device.
> AGC circuit is not locked	Warning: AGC Not Locked	RED	RF input gain is close to margin. Adjust the input gain to eliminate the warning. If the warning light remains on, return the transmitter for repair
> Fan fault	Warning: Fan Failure	RED	The rear fan is faulty. The transmitter needs to be repaired.
> Modulator drive gain is low	Warning: OMI Low	RED	The RF drive power entering the modulator is low. The CNR performance can be improved by increasing OMI.
> Modulator drive gain is high	Warning: OMI Hi	RED	The RF drive power entering the modulator is high. The distortion performance can be improved by decreasing the OMI.

POSSIBLE RESOLUTIONS

I. Some of the warnings stated above can be resolved by restarting the power supply or pressing the “On/Off’ button on the front panel. Please notify your Taikan representative if the warning indicator is still on.

II. To prevent any type of warning please follow these setup requirements:

> Ensure that the transmitter is placed in a temperature controlled environment of 0 °C ~ 50° C, that is also dust free.
> Make sure the transmitter is properly ventilated and allow ample space for the rear fan to work
> Check the power supply to confirm that it meets standard requirements. In addition check all connections are secure.
> Double check the changing of the RF gain.
> Keep the fiber connector clean.

III. The modulator deflector voltage warning can be resolved by resetting its deflection. To reset the deflection, press the “On/Off” button and press it again to turn it on. It will take approximately 45 minutes for the transmitter to return to stable status. During this period, the CSO value will be compromised, and the output and floating signal will decrease. This step should be carried out at a time that would least affect your subscribers. Please contact your Taikan representative if this still does not resolve the situation.

SECTION SEVEN

// RETURN & WARRANTY

PRODUCT RETURN PROCEDURE

If you need to return the product for repair, please follow these steps:

1. Contact a Taikan Representative at support@taikan.com to obtain a Return Authorization Number
2. When returning the product for repair include the following information:
   - > Return Authorization Number
   - > Model Number
   - > Serial Number
   - > Reason for Return
3. Prior to repairing the device, Taikan will inform you about the test results and/or any additional repair charges that may apply. Once we have received your confirmation we will proceed with the repair.
4. The repair period will depend on the severity of the problem.
5. After it is returned, the product will still be under its original warranty. The repair component(s) is under warranty for 90 days after you have received the repaired product. (see below)

STANDARD TAIKAN PRODUCT WARRANTY

Taikan provides a limited three year Warranty (“Warranty”) to original purchaser on its product against manufacturing defect and workmanship under normal use and service. During the Warranty period Taikan will repair or replace the product to correct defects in material and workmanship.

This Warranty shall not apply to a product which has been altered in any way so as to affect its stability or durability, nor which has been subject to misuse or negligence. This Warranty does not cover a product which has been damaged by severe weather conditions such as extreme wind, ice, storms, lightning, or other natural weather conditions over which Taikan has no control.

Claimants under this Warranty shall present their claim along with the defective product to Taikan Non-compliance with any part of this claim procedure may invalidate this Warranty in whole or part.

This Warranty is expressly in lieu of all other agreements and warranties, expressed or implied. Taikan does not authorize any person to assume for it the obligations contained in this warranty and neither assumes nor authorizes any representative or other person to assume for it any other liabilities in connection with the product delivered or provided.

In no event shall Taikan be liable for any loss of profits, loss of use, interruption of business, or indirect, consequential damages of any kind. Taikan will not be liable for damages in any amount greater than the purchase price of the product.